REMARKS

Claims 1-6 and 9-15 are pending in this application. Claim 5 has been withdrawn from consideration. By this Amendment, the specification and claims 1-5, 9 and 14 are amended, and new claim 15 is added. Claims 7 and 8 are canceled without prejudice to, or disclaimer of, the subject matter recited therein. Support for the amendments and the new claim can be found, for example, in the specification and the claims as originally filed (see page 8 lines 23-26; pages 11-12; and claims 7 and 8). No new matter is added.

The courtesies extended to Applicants' representative by Examiner Crouse at the personal interview held on August 6, 2010, and during the telephone interview held on August 18, 2010 are appreciated. The reasons presented at the interviews as warranting favorable action are incorporated into the remarks below, which constitute Applicants' separate record of the interviews.

In view of the foregoing amendments and the following remarks, reconsideration and allowance of the claims are respectfully requested.

I. Objection to the Specification

The Patent Office objects to the specification due to informalities. The specification is amended, as shown above, to obviate the objection. Accordingly, reconsideration and withdrawal of the objection are respectfully requested.

II. Rejections Under 35 U.S.C. §102

A. Yu

The Patent Office rejects claims 1-4 and 6-14 under 35 U.S.C. §102(e) over U.S. Patent No. 7,098,060 to Yu et al. ("Yu"). Claims 7 and 8 are canceled, thus rendering the rejection moot as to those claims. As to the remaining claims, this rejection is respectfully traversed.

Yu describes a method for producing an organic electroluminescent (EL) device comprising, *inter alia*: (1) depositing an anode layer on a substrate; (2) establishing a plurality of discrete wells in the substrate; (3) depositing an unpatterned EL host polymer layer into each of the wells; and (4) depositing at least one patterned dopant layer in at least one of the wells (Yu, col. 3, lines 15-33). In particular, Yu discloses an electroluminescent polymer layer that is spin-coated (Yu, col. 6, line 1). For "bilayer" devices in Yu, Yu discloses a first thin layer of the blue EL polymer being spin-coated and annealed for 10 minutes at 60°C, followed by the spinning of a second layer, as discussed during the August 6 personal interview (Yu, Example 1, col. 10. lines 30-67).

However, Yu does not disclose an organic electroluminescent element comprising a layer which is formed by causing gas molecules of at least one type of compound selected from the group consisting of fluorescent dyes and charge transport materials to contact and penetrate the unsubstituted π conjugated organic polymer compound by heating the unsubstituted π conjugated organic polymer in a thermostatic chamber, the thermostatic chamber comprising: a sealed container saturated with a vapor and maintained at an elevated temperature for a period of time, wherein the elevated temperature is below the melting point of the unsubstituted π conjugated organic polymer compound, the period of time being long enough for the compound selected from the group consisting of the fluorescent dyes and charge transport materials to diffuse through said organic polymer, as recited in claims 1-4. Yu discloses neither these process steps, nor the product formed thereby where the specified gas molecules are penetrated into the unsubstituted π conjugated organic polymer.

Instead, the electroluminescent device of Yu is a result of the deposition of a dopant molecule on top of a polymer layer, with or without diffusion of an addional dopant into the polymer host. Yu does not disclose a simultaneous deposition and diffusion, as recited in claims 1-4. As a result, the device of Yu does not include gas molecules, which have

contacted and penetrated into the unsubstituted π conjugated organic polymer, thereby improving the overall luminance and quantum efficiency of the device over traditional deposition methods (specification, page 4).

Based on the above, Yu fails to disclose each and every feature of claims 1-4 and, thus, does not anticipate claims 1-4. The remaining claims variously depend from claim 1 and, likewise, are not anticipated by Yu for at least the reasons set forth above with respect to claim 1, as well as for the additional features recited therein.

Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

B. Tang '357 and Tang '292

The Patent Office rejects claims 1, 2, 6-10 and 13 under 35 U.S.C. §102(b) over U.S. Patent No. 6,066,357 to Tang et al. ("Tang '357") as evidenced by U.S. Patent No. 4,769,292 to Tang et al. ("Tang '292"). Claims 7 and 8 are canceled, thus rendering the rejection moot as to those claims. As to the remaining claims, this rejection is respectfully traversed.

Tang '357 describes a method for producing an organic light-emitting display by the following steps comprising, *inter alia*: (1) providing a substrate; (2) forming an organic hole-transporting layer over the substrate; (3) forming an organic light-emitting layer over the hole-transporting layer; (4) forming a dopant layer over the organic light-emitting layer; and (5) forming an organic electron-transporting layer over the doped light-emitting layer (Tang '357, col. 4, lines 1-19). More specifically, Tang '357 describes the use of vapor phase deposition in producing its display device, whereby, for example, a light-emitting layer is exposed to fluid vapor steam (Tang '357, Abstract and col. 11, lines 38 to 67). The fluid vapor acts to create molecular diffusion paths in the light-emitting layer, and promote the diffusion of dopants from the dopant layer to the overlying light-emitting layer. Suitable fluids of Tang '357, which can be used to provide the fluid vapor, include alcohols, ketones,

and chlorinated fluids (Tang '357, col. 11, lines 17-23). Tang '357 further discloses separating the depositing step of the organic light-emitting layer from the depositing step of a fluorescent dopant layer, and a seven second duration of time for exposure to a vapor stream. In contrast, the pending claims undergo contact and penetration for one or more hours (see Tang 357, col. 4, lines 22-29; and Example 2, col. 12; and specification, pages 11 and 14). Because the penetration depth of a dopant into the host polymer layer is a function of temperature and time, the pending claims allow for abundant penetration deep into the polymer layer, via simultaneous deposition and diffusion.

In view of the foregoing, Tang '357 as evidenced by Tang '292 does not disclose an organic electroluminescent element comprising a layer which is formed by causing gas molecules of specified compounds to contact and penetrate the unsubstituted π conjugated organic polymer compound by heating the unsubstituted π conjugated organic polymer in a thermostatic chamber, the thermostatic chamber comprising: a sealed container saturated with a vapor and maintained at an elevated temperature for a period of time, wherein the elevated temperature is below the melting point of the unsubstituted π conjugated organic polymer compound, the period of time being long enough for the compound selected from the group consisting of the fluorescent dyes and charge transport materials to diffuse through said organic polymer, as recited in claims 1 and 2. The device of Tang '357 as evidenced by Tang '292 merely consists of a plurality of layers (*e.g.*, a light-emitting layer, a dopant layer and an electron-transporting layer) that are vapor deposited in sequential fashion over an underlying substrate (Tang '357, col. 4, lines 1-19).

Based on the above, Tang '357 as evidenced by Tang '292 fails to disclose each and every feature of claims 1 and 2 and, thus, does not anticipate claims 1 and 2. The remaining claims variously depend from claim 1 and, likewise, are not anticipated by Tang '357 for at

least the reasons set forth above with respect to claim 1, as well as for the additional features recited therein.

Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

C. **Seo**

The Patent Office rejects claims 1-4, 6, 7 and 10 under 35 U.S.C. §102(b) over U.S. Patent Application Publication No. 2002/0028349 to Seo ("Seo"). Claims 7 and 8 are canceled, thus rendering the rejection moot as to those claims. As to the remaining claims, this rejection is respectfully traversed.

Without conceding to the propriety of the rejection, and in the interest of obtaining allowance, independent claims 1-4 are amended to incorporate the subject matter of non-rejected claim 8. Accordingly, the rejection is overcome and should be withdrawn. Reconsideration and withdrawal of the rejection are respectfully requested.

D. **Matsuo**

The Patent Office rejects claims 1-4 and 6-14 under 35 U.S.C. §102(b) over EP 1,143,773 to Matsuo et al. ("Matsuo"). Claims 7 and 8 are canceled, thus rendering the rejection moot as to those claims. As to the remaining claims, this rejection is respectfully traversed.

Matsuo, directed to an organic light-emitting device, describes a polymer substrate being doped by steaming in the preparation of its device. The steaming is conducted by heating a solution that includes a dopant species dissolved in toluene. After exposure to steam, the polymer substrate is heated at 110°C for 1 minute on a hot plate (Matsuo, paragraph [0211]). The dopant deposition was performed during the steaming time, and the dopant diffusion was performed at 110°C for a one-minute heat treatment time. This separation of the deposition and diffusion processes (two-step procedure) distinguishes

Matsuo from the one-step integrated procedure of the pending claims, which results in two structurally distinct devices.

In support that the devices of independent claims 1-4 are not anticipated by Matsuo, a Declaration Under 37 C.F.R. §1.132 of Hiroyuki Mochizuki ("Declaration") demonstrating structural differences between the device of Matsuo and the devices of claims 1-4 is hereby submitted, as discussed in part during the August 18, 2010 telephone interview.

As described in the Declaration, experimental tests were conducted on an electroluminescent device prepared according to Example 16 in Matsuo; and an electroluminescent device prepared according to Example 2 of the specification (see Matsuo, paragraph [0222]; and specification, pages 14-15). In preparing the device of Matsuo, an orange colored fluorescent dye (4-(dicyanomethyl)-2-methyl-6-(4-dimethylaminostyryl)-4-H-pyran (DCM) was deposited on poly (p-phenylenevinylene) (PPV) formed on a glass substrate. The sample was heated for one minute at 110 °C. Afterwards, when the vermillion surface of the PPV was wiped with cotton soaked in acetone, the vermillion portion disappeared, thereby exposing the original yellow PPV exposed on the surface of the substrate. This finding demonstrates that the DCM (fluorescent dye) failed to penetrate into the PPV in the device prepared according to the method disclosed in Matsuo.

In addition, the maximum luminance of the Matsuo's electroluminescent device was less than 1 cd/m^2 at 14V, and the quantum efficiency was less than 0.005 lm/w, whereas the maximum luminance of the device according to Example 2 of the specification was 2000 cd/m^2 at 14V, and the external quantum efficiency was 4.1 lm/w.

These noticeably substantial differences with respect to penetration of the fluorescent dye, maximum luminance and external quantum efficiency provide support that Matsuo fails to disclose each and every feature of claims 1-4. Accordingly, Matuso does not anticipate claims 1-4. The remaining claims variously depend from claim 1 and, likewise, are not

anticipated by Matsuo for at least the reasons set forth above with respect to claim 1, as well as for the additional features recited therein.

Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

III. Rejection Under 35 U.S.C. §103

The Patent Office rejects claims 1-4, 6-9, 13 and 14 under 35 U.S.C. §103(a) over U.S. Patent No. 6,313,261 to Samuel et al. ("Samuel") in view of Matsuo. Claims 7 and 8 are canceled, thus rendering the rejection moot as to those claims. As to the remaining claims, this rejection is respectfully traversed.

The above discussion with respect to Matsuo and the Declaration applies to this rejection.

The Patent Office alleges that Samuel discloses various features of claims 1-4. However, the Patent Office concedes that Samuel does not disclose diffusion of the dopant into the polymer layer. The Patent Office applies Matsuo to allegedly remedy the deficiencies of Samuel. The sizeable differences with respect to maximum luminance and external quantum efficiency that was achieved as a result of causing gas molecules of at least one type of compound selected from the group consisting of fluorescent dyes and charge transport materials to contact and penetrate the unsubstituted π conjugated organic polymer compound by heating the unsubstituted π conjugated organic polymer in a thermostatic chamber in the manner recited in claims 1-4, was unexpected from similar electroluminescent devices that were prepared according to the method disclosed in Matsuo. Furthermore, Matsuo and Samuel provide no reason or rationale for one of ordinary skill in the art to have combined and modified the references in the manner necessary to have obtained the device recited in claims 1-4 with any reasonable expectation of success.

Based on the above, Samuel and Matsuo would not have rendered claims 1-4 obvious. The remaining claims variously depend from claim 1 and, likewise, would not have been rendered obvious by the applied references for at least the reasons set forth above with respect to claim 1, as well as for the additional features recited therein.

Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

IV. New Claim

By this Amendment, new claim 15 is added. New claim 15 depends from claim 1 and, thus, is patentable for at least the reasons set forth above with respect to claim 1, as well as for the additional features recited therein.

Prompt examination and allowance of new claim 15 are respectfully requested.

V. Conclusion

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of the claims are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,

James A. Oliff
Registration No. 27,075

Sarah Lhymn
Registration No. 65,041

JAO:SQL/hs

Attachments:
Declaration Under 37 C.F.R. §1.132
Petition for Extension of Time

Date: November 15, 2010

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